

THE STATUS OF *CRINUM STRICTUM* (AMARYLLIDACEAE)

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ABSTRACT

A literature review and statistical analyses of the traits used to distinguish *C. strictum* Herbert from *C. americanum* L. show that the species cannot be reliably separated. *Crinum strictum* is therefore considered to be conspecific with *C. americanum*.

In preparing a treatment of the genus *Crinum* for the Flora of North America Project, it became apparent that the plant referred to as *C. strictum* Herbert by Traub (1962), Correll & Johnston (1970), and Correll & Correll (1972) is not adequately distinguished from the more prevalent and widely distributed *C. americanum* L. Although Lehmler (1987) asserts that *C. strictum* should be considered as synonymous with *C. americanum*, the retention of the name in Johnston (1990) and in Hatch et al. (1990) evidences that the matter has not been resolved. The object of this study is to reexamine, by statistical methods and literature review, the status of *C. strictum* in relation to *C. americanum*.

MATERIALS AND METHODS

The study is based upon examination of about 200 specimens borrowed from the following herbaria: ASTC, BAYLU, BRIT/SMU, FLAS, GA, GH, LAF, LL, LSU, MO, NCU, NLU, NO, NY, TAES, TEX, UNA, and USF. The lengths of the perianth tube and perianth segments, the character cited by Traub (1962) and Correll and Johnston (1970) as primarily distinguishing *C. americanum* from *C. strictum*, were measured. One hundred and twelve specimens of *C. americanum* had flowers suitable for measuring, while only three specimens of *C. strictum*, those cited by Moldenke (1962) and Traub (1962), were available for study. The limited number of data points for *C. strictum* permitted a two sample comparison of variances test (Zar 1984) to be run to determine if statistical differences existed between the two populations for the traits measured. In addition, the same statistical test was used to compare the ratio of perianth tube to perianth segment length

A comprehensive literature review was also necessary because it became apparent that one had never been conducted for the species.

RESULTS

From the beginning, *Crinum strictum* has been problematic. The plant has an interesting nomenclatural history, a review of which is essential for understanding the status of the plant, as proposed by Herbert, and as currently applied to some of the Texas expressions of *Crinum*.

Herbert's (1816) description of *C. strictum* included a brief Latin diagnosis and an excellent line drawing. The plant described has four flowers with tubes 5 unciali [or inches = 12.7 cm] long and perianth segments $3 - 1/4$ unciali [8.3 cm] long. This relationship of tube to perianth segment length is also supported by the illustration, although "the figure of the plant is diminished." The description was based on a specimen grown in Spafforth, England from a bulb reportedly collected in Ceylon (Sri Lanka). Herbert doubted that this was the correct source since the plant had no affinities with any known *Crinum* from that area. In fact, he "doubted if it was from the East or West," mentions that the plant appears to have affinity with *C. americanum*, and suggested that the bulb may have been from the New World. In 1837, Herbert surmised, largely based on supposed relationships with *C. americanum*, that the location from which the bulb came was Mexico.

Traub (1962) amplified Herbert's original species description, based upon a plant grown in La Jolla, California from a bulb collected in Jefferson County, Texas. In his description and discussion, he presents two major points important to the identity of *C. strictum*. The "tepaltube" is given as 8.4 cm long and the "tepalsegs" as 10.8 cm long. He also determines that the bulb Herbert obtained was from Texas, based upon Herbert's (1837) surmise that the plant was from Mexico, which in 1816 included Texas. He suggested that it could have been collected in the general area of the Gulf Coast (Jefferson County), where Mrs. Carl Shirley found the bulb that ultimately provided the basis of the description amplification. The evidence for matching the two plants (the Herbert plant and the Shirley plant) appears to be Herbert's (1816) comment "it is remarkable for the erectness of all of its parts," which Traub (1962) describes in the Shirley plant as a "proudly upright stance." In a brief introduction, Traub also comments on the rhizome with "without exception ... [it] went down: never laterally as rhizomes usually do." This was not included in his species amplification. The current usage of the name *C. strictum* by Correll and Johnston (1970), Correll and Correll (1972), and its retention as a valid species in Johnston (1990) and in Hatch et al. (1990) is clearly based upon Traub's (1962) amplification of the original Herbert (1816) description. Basically, the name *Crinum strictum* is used to refer to those Texas *Crinum* which are distinguished from the more abundant *C. americanum* by perianth segments that are longer than the perianth tube.

In 1972, Hannibal reported that *Crinum strictum* Herbert is an illegitimate name because *C. strictum* Hornemann has name priority. Hornemann published that name, along with a Latin description, in *Enumeratio Plantarum Horti botanici Hafniensis* 13. 1807 and again in *Hortus Hafniensis* 1:318. 1813. That name,

according to Hannibal, refers to a species from the Caribbean area which differs completely from the Herbert plant. Both Hornemann references are listed in *Index Kewensis* immediately following the Herbert entry, but as is standard in the original indices, the year of publication is not given. Hannibal, therefore, proposed the name *C. texanum* Hannibal to refer to those plants formerly known as *C. strictum* Herbert. He erroneously states the name is a *species nova* rather than a *nomen nova*, but evidently effected the nomenclatural change. Anne Fox Maule, of Copenhagen, in providing me with copies of the Hornemann references and advising me that the publication is valid, stated "we (C) have no material of this species as is often the case with more or less succulent species from early publications" (pers. comm.). The matter was further complicated by both the *Gray Herbarium Index* and *Index Kewensis* incorrectly citing Hannibal's (1972) publication as volume 3 (which is year 1962) of the Bulletin of the Louisiana Society for Horticultural Research rather than volume 13 of year 1972.

From the above, it can be concluded that those plants of Texas currently referred to as *Crinum strictum* are based on a plant grown from a bulb which, largely upon morphological similarity to *C. americanum* alone, Herbert (1816, 1837) believed to be from the New World (possibly Mexico) and Traub (1962) said may be from the Texas Gulf coast (Jefferson Co.), probably based on erectness of flowers. The actual location of the source of the bulb is unknown. The plant was originally described by Herbert (1816) as having a corolla tube (1.5 x) longer than the perianth, yet in Traub's (1962) amplification of the description, also from a specimen under cultivation, the tube length is shorter than the perianth segments. This trait is emphasized because it is the major characteristic used to distinguish *C. strictum* Herbert from *C. americanum* L. Thus, there is ample doubt as to whether *C. strictum* as applied in Texas is specifically distinct from *C. americanum*. It is also an illegitimate use of the name *C. strictum*. Indeed, if the plants now referred to as *C. strictum* Herbert are specifically distinct from *C. americanum*, the legitimate name is *C. texanum* Hannibal. The following lines of evidence supports that *C. strictum* (or *C. texanum*) should be merged into *C. americanum*. This is in agreement with Lehmler (1987), who, based upon morphological data and extensive field observation, also concludes that *C. strictum* is not specifically distinct from *C. americanum*.

1. Three statistical comparisons (Table 1) of tube length, perianth segment length, and a ratio of perianth segment length divided by tube length showed that no significant differences existed between those plants identified as *C. strictum* by Moldenke (1962) and Traub (1962) and *C. americanum* from both Texas and the southeastern United States.

2. The condition of perianth segments being longer than the tube is present in other native *Crinum* from southeast U.S.; e.g., *Ouchley s.n.* (LAF) from Louisiana and *Lakela & Long 29927* (USF) from Florida. Other herbarium specimens showed that the length of flower parts in the native southeastern *Crinum* is ex-

TABLE 1. Two Sample Comparison of Variances (Zar 1984).

Species	$\bar{X}(N)^a$	S.E. ^a	Range ^a	Variance ^a	F ^a
TUBE LENGTH					
<i>C. americanum</i>	11.9732(112)	0.192060	6.0 – 15.5	4.13150	1.3320 ^b
<i>C. strictum</i>	10.9667(3)	0.113680	8.4 – 11.5	5.50330	
PERIANTH SEGMENT LENGTH					
<i>C. americanum</i>	8.03125(112)	0.113680	6.0 – 11.0	1.44740	3.2909 ^b
<i>C. strictum</i>	8.8667(3)	1.260070	6.5 – 10.8	4.76330	
RATIO (PERIANTH SEGMENT LENGTH DIVIDED BY TUBE LENGTH)					
<i>C. americanum</i>	0.6785(112)	0.010886	0.45 – 1.15	0.01327	10.8741 ^b
<i>C. strictum</i>	0.8600(3)	0.219317	0.57 – 1.29	0.14430	

^a $\bar{X}(N)$ = mean and sample size; SE = standard error; Range = lowest and highest data values; F value = variance of *C. strictum* divided by variance of *C. americanum*

^bF_{0.05} (2), 111, 2 = 39.5, therefore all populations are statistically equal at the 0.05 level for all traits.

ceedingly variable and unreliable for specific delimitation (see range, Table 1). In fact, specimens of *C. americanum*, such as *Thieret 16609* (LAF) had tube lengths varying from 1 – 9.5 cm while perianth segments were up to 8 cm long. *Brooks et al. 943* (LAF) has a similar condition in which the perianth tubes were 5 – 12 cm long while the perianth segments were about 8 cm long. Thus these two specimens have flowers of both types in the same inflorescence (with tube longer than and shorter than the perianth segments), further supports that these traits are not reliable for specific separation.

3. Specimens mentioned by Moldenke (1962) as being part of the *C. strictum* group, have perianth segments that are shorter than the tube thus technically cannot be identified as part of the species.

4. All known specimens determined to be *C. strictum* were cultivated and thus not subject to the normal environmental conditions. Minor vegetative or habit differences, such as upright stance, mentioned by Traub (1962) may be due to factors of cultivation, treatments, or age or size of bulbs.

5. *Crinum strictum*, as proposed by Herbert (1816) has no described differences that separate it from *C. americanum*. He (1816, 1837) additionally emphasizes its affinity with *C. americanum*. It may be concluded that Herbert proposed the species as new because it was not from the southeast United States and that it was different from the native *Crinum* of its stated origin, Sri Lanka, or, as believed later, Mexico.

The plant cited as *Crinum strictum* var. *traubii* Moldenke by Correll and Johnston (1970), Correll and Correll (1972), and Hatch et al. (1990) should correctly be called *C. americanum* var. *traubii* (Moldenke) Hannibal, the transfer being effected by Hannibal in Bull. La. Soc. Hort. Res. 13:308. 1972. The plant is known only from cultivated specimens grown from bulbs collected in Hardin Co. It differs from var. *americanum* by its more numerous flowers (6 – 7), longer foliage, and deeper green color.

In transferring variety *traubii* from *C. strictum* to *C. americanum*, Hannibal (1972) gives the name as follows:

***Crinum americanum* var. *traubii* (Holdenke) Hannibal ssp. comb. nov.**

The actual name is listed as a variety, but the nature of the transfer indicates subspecies, thus being ambiguous on rank of the taxon. The use of variety in the name, as in the basionym, appears to be the rank of the taxon accepted by Hannibal, and his use of the subspecific rank in denoting the nature of the transfer may be due to unfamiliarity in applying the Code. The transfer thus seems to be valid. Note also that Moldenke, author of the basionym, is incorrectly spelled as "Holdenke," most likely a typographical error.

Lehmiller (1987) proposed that var. *traubii* should also be merged into *C. americanum* because the cited differences may be artifacts of cultivation. The specimens that I examined, *Hamilton P. Traub 515a + b* (MO) and *675a + b* (MO, HOLOTYPE of *C. strictum* var. *traubii*), do differ from var. *americanum* in the traits described. The name is also validly proposed, and until such time as it can be shown that the differences cited by Moldenke (1962) are solely artifacts of cultivation, the varietal distinctness should be maintained.

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